

CDF Supervised Access Procedure

(This is a Safety Procedure)

This procedure outlines the steps and training required to enter the Supervised Access areas in the CDF building.

Editorial Hand-Processed Changes Other Than Spelling
Requires the Operations Department Head Approval

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Approvals

(CDF Operations Department Head)

(Date)

Technical Appendix to CDF Supervised Access Procedure #004

**The following TA is in effect until a solution is found
that will correct the problem with the ODH Heads.**

If access to the collision hall is necessary, the operations manager should instruct the cryo/gas tech to set the collision hall HVAC system to "low purge" and "access" on the IFIX HVAC page for the duration of the access. "Low purge" ensures that the collision hall remains ODH Class 0.

The "access" condition monitors that the "low purge" condition is in effect, and sounds the ODH alarm for evacuation of the collision hall if the system is not in "low purge". When activated, both the "low purge" and "access" buttons will show green.

On completion of the access, the "access" button should be deactivated (it will change to gray) and the HVAC switched from "low purge" to "high HVAC".

With this monitoring via the "access" button, it is no longer necessary for someone to watch the IFIX console continuously. The shift crew should of course be alert to ODH alarms and should check at least once per shift that the IFIX page looks normal. The cryo/gas technicians should also check once per shift during the access that the system is correctly configured.

1.0 Controlled Copies of this procedure.

Four controlled copies of this procedure will exist in the following locations:

1. CDF Control Room in the CDF Assembly Building
2. PPD / CDF Department Office
3. Particle Physics Division Office
4. Beams Division Office
5. On the CDF Web Page

All other copies will be marked, " INFORMATIONAL COPY ONLY. "

2.0 The Procedure.

The CDF Operations Manager, in consultation with the CDF Safety Coordinator, or designee*, controls the personnel entering the Collision or lower Assembly Hall area during periods of "Supervised Access".

The CDF Safety Coordinator should consult the list of trained personnel (in TRAIN or Keylogger) and give a "White Supervised Access Key" to those who have current training in the Supervised Access rules and all prerequisite training. Persons receiving a key must sign out the key on the form on the CDF Safety Coordinator's desk and sign in that key on the same form when they return the key. This information will also be entered into the Keylogger by the CDF Safety Coordinator.

When issuing White Supervised Access Keys, the CDF Safety Coordinator should, to the extent possible, remind people that they must wear a TLD badge and , if necessary, wear a hard hat. The CDF Safety Coordinator will inform work parties of any special conditions or restricted work areas and will advise them as to whether additional equipment is necessary and if additional rules apply. The CDF Safety Coordinator should inquire as to where the person will be working and establish that the two person rule will be obeyed.

*To simplify this document, it should be noted that for the rest of this document, wherever the CDF Safety Coordinator is named, this will imply 'the CDF Safety Coordinator or designee.'

3.0 Checklist

No "Procedure Execution Form" is required for this Supervised Access Procedure as this is primarily a training document.

The Keylogger and the "White Supervised Access Key Sign-out / Sign-in Form" serves as an aid in the execution of the procedure. A copy of this form is included as an appendix to this procedure. The forms are kept on a clipboard in the CDF Control Room on the CDF Safety Coordinator's desk.

The key sign-out / sign-in forms are not meant to be kept as a permanent record, but will be retained for a period of at least 3 months.

4.0 Deviations from the Procedure

I. Additional Restrictions:

Occasionally, the CDF Operations Manager may wish to restrict the number or types of people in the Supervised Access area during Supervised Access periods. The CDF Operations Manager should give the CDF Safety Coordinator a list of people authorized for entry during a specific period. The CDF Safety Coordinator then dispenses the "White Supervised Access Keys" to people on the list, as long as those people are also on the trained Supervised Access list.

II. Escorts:

Occasionally, special visitors may wish to enter the Supervised Access area on tours or in circumstances where there is not sufficient time to receive all the prerequisite training for Supervised Access Training. For these circumstances, the following conditions must be met.

Such visitors must be at least 18 years of age.

The CDF Safety Coordinator must notify the Operations Manager and may be required to notify the appropriate Radiation Safety Officer before admitting any visitor.

Such visitors can then enter the Supervised Access area only when accompanied by a fully trained person (now designated as an escort and charged by the CDF Safety Coordinator with the additional responsibility of watching the visitor and insuring that the visitor has any required personnel protection / monitoring equipment).

The escort and the CDF Safety Coordinator should brief the visitor on the hazards in the area, using the standard Supervised Access Training form as a guide.

The escort and each visitor may be required to wear a TLD badge. (Check with the Safety Coordinator to find out the current rules .)

Each escort should accompany only the number of people for which he/she can maintain positive control and supervision.

5.0 Required Training and Authorized Training Personnel.**I. Prerequisite Training:**

The following training is required **as a prerequisite** for Supervised Access.

LOTO I or LOTO II

Rad Worker or Rad Con Tech Training

In the case of walkthroughs or inspections, those people participating will be required to have General Employee Radiation Training (GERT) ,and a qualified escort.

II. Required Training

The required training for Supervised Access is simple. Individuals read the training document, " CDF Supervised Access Work Rules," sign the attached form, complete the quiz, and return the form and quiz to the CDF Safety Coordinator. Forms are kept with the CDF Safety Coordinators office and the information will be transferred to the appropriate database.

III. Training Personnel

The CDF Safety Coordinator, the CDF Operations Manager, and the CDF assistant head for ES&H are trained in this procedure and are authorized to train other individuals for Supervised Access.

6.0 Training Materials.

The document beginning on the next page is the training document for CDF Supervised Access. A copy of this training document should be given to each trainee for future reference.

Copies of the training document and procedure are kept in the CDF Control Room on the CDF Safety Coordinator's desk.

CDF Supervised Access Work Rules

1. Introduction ---

Access to the CDF Collision Hall and Assembly Hall areas is restricted due to the special hazards associated with accelerator and the CDF detector components. These hazards are outlined in the next section.

There are two types of access allowed into the CDF Collision Hall area:

"Controlled Access" into the Collision Hall is the most restrictive and requires that you take additional training beyond that given in this document.

"Supervised Access" is less restrictive and requires that you read and sign that you have understood this document.

Read this document carefully and completely -- there is a test.

Once on the Supervised Access list, you are allowed access to the area by means of a "White Supervised Access Key" checked out to you by the CDF Safety Coordinator.

Note that the area defined under Supervised Access control may change depending on the status of the CDF experiment and the accelerator. At times, the area may be just the Collision Hall, or just the Assembly Pit, or it may include the entire lower level pit area. The CDF Safety Coordinator will inform you of the status and where the White Key will be required to gain access.

The following training is required **before** you can be trained for Supervised Access:

LOTO I or LOTO II

Rad Worker Training or Rad Con Tech Training

If the work to be performed in the CDF lower level pit **ONLY** involves walkthroughs and inspections, then General Employee Radiological Training (**GERT**) is all that is necessary. However, a qualified escort must accompany the individual or group.

2. General Hazards in the CDF Supervised Access area

In addition to the conventional workplace hazards such as working at heights, fire, falling objects, electrical hazards and confined spaces, there are important unusual systems for which a failure or malfunction could create hazardous conditions.

It is the responsibility of the worker and their supervisor to determine if an additional Work Plan / JHA is required before doing work in these areas. Everyone must wear Personal Protective Equipment that is appropriate for the work they are doing. This document identifies many of the hazardous conditions you may encounter and describes methods to mitigate them. If you are not sure ask your supervisor or the Operations Manager.

These include the following:

A. Radioactivity:

Modest radiation fields can be found adjacent to activated accelerator components and CDF radioactive calibration sources on the detector.

Obey all posted signs for radioactive materials.

The Collision Hall is designated as "Controlled Area" during Supervised Access. **All materials brought out of the Collision Hall must be checked for residual radioactivity** in accordance with Laboratory Policy on tagging and disposal of radioactive materials. Any work involving drilling or coring concrete, steel, or other material in the Collision Hall may require **prior notification** of the Radiation Safety Officer. Check with the CDF Safety Coordinator.

When the CDF detector is in the CDF Assembly Pit, the Pit will be considered a Radiological Controlled Area.

Radioactive Sources must be handled in accordance with the Particle Physics Division Policy by trained personnel.

B. Flammable Gas:

Ethane is used in a 50 / 50 mixture with Argon in many parts of the CDF detector. The total inventory is approximately 75 cubic meters of Argon / Ethane mixture.

Ethane is flammable in the concentrations of 3% to 12.5% in air. These flammable gas systems could cause personnel harm or equipment damage if certain work activities were not controlled and evaluated for safety before allowing work to begin. Any work activity that involves welding, burning, brazing, or abrasive grinding requires a special permit, which can be obtained from the Fire Department. **Welding permits will not be issued for areas within ten meters of the equipment containing flammable gas unless approved in advanced by the Division Head (FESHM 6020.3-6).** The CDF Operations Manager must approve all work before it begins. This permit will allow ready checking for risk evaluation, required controls, and approval by authorized persons.

Typically other ignition sources will not be permitted for use within 20 feet of a flammable gas source. Occasionally maintenance requirements make it necessary to work inside of this boundary. Any work that involves the use of soldering irons or heat guns or other ignition sources must have a written JHA/ Work plan approved by the operations manager and the CDF Department head.

NO SMOKING is permitted in the Supervised Access area.

C. Toxic Materials:

Any fire involving the CDF detector cable plant or the plastics of the wire chambers can release Hydrochloric acid (HCL), Carbon Monoxide (CO), and some Cyanides. Evacuate in case of fire.

The beam pipe through the central detector is made of beryllium. Avoid damage to the beampipe. Immediately report any damage to the CDF Safety Coordinator.

D. Oxygen Deficiency Hazard (ODH):

Liquid helium and liquid nitrogen are present in the cryogenic systems in the Tevatron and the CDF Solenoid. When the ventilation systems in the Collision Hall and Assembly Hall are operating properly, these areas are classified as ODH Class 0. However, if the system malfunctions, it is possible that the area may become an ODH Class 1 area. If the alarm sounds, evacuate the area.

Exposure to liquid helium ,liquid nitrogen and liquid suva gas or the boil off from these gases can cause personnel injury due to burns. Only trained personnel may work with this equipment.

E. High Voltage:

Most CDF detectors make use of high voltage greater than 1000 volts DC, and some accelerator devices like vac-ion pumps and beam loss monitors require high voltages as well. Most of the high voltage cables are **red**. In all cases, the high voltage power supplies are located outside the enclosure and are, therefore, controlled remotely but are not de-energized prior to allowing personnel access. Take appropriate protective measures when working on such equipment and cables.

F. Magnetic Fields:

When energized, the CDF Solenoid creates high fields and high gradients in the area of the 3-degree hole, around the beampipe, in the central part of the detector.

In some regions around the solenoid, the field is strong enough to make a ferrous object (such as a screwdriver) into a projectile that could damage the Detector or hurt someone. The magnetic fields can erase the magnetic strip on credit cards and can magnetize or ruin wristwatches. CRTs, scopes, and walkie-talkies can be damaged by magnetic fields. **Surgical metal implants and pacemakers are also affected by magnetic fields regardless of the type of metal. Persons with such devices will need Medical clearance before entry into an area with magnetic fields.**

The CDF Solenoid magnet may be powered during Supervised Access mode or Controlled Access mode or during periods when the Central Detector is in the Assembly Hall. **In this case, the restricted area around the detector will be marked with signs and ropes and entry into the area will require additional permission from the CDF Operations Manager. Entry to the catwalk is prohibited when the solenoid is powered.**

G. Hearing Hazards:

Normally, there are no hearing hazards in the CDF Collision Hall or Assembly Pit. Occasionally, grinding may take place or the large ventilation fans in the Collision Hall, may be operating, causing a hearing hazard. If this is the case, hearing protection should be worn.

H. Electrical Hazards

A variety of commercially available and some CDF specific electrical equipment is located or utilized on and near the detector. Most of this equipment operates at low voltages and have the capacity to deliver high currents. Failure to follow safe work practices can result in fire or burns. All equipment meets applicable NEC and NEMA codes and FNAL Safety requirements.

Administrative procedures including lockout/tagout are in effect for all work on electrical equipment and systems.

I. Kinetic and Potential Energy Sources

Operation of hand held power tools and manual tools as well as rotating machinery operations associated with small vacuum pumps may occur in this area. Personnel should receive technical and safety training when utilizing tools and equipment.

A 50 ton crane is available for use in this zone. Only trained personnel are allowed to use this equipment.

Many of the detector components require the use of high pressure hydraulic systems to move them. Even a small leak in these systems, which can run at several thousand pounds per square inch, can be a hazard without eye protection. All work with these systems requires a written procedure.

Pressurized water and gas systems are being used to cool electronic components on the detector. Leaks in these systems can do a great deal of damage to the detector. If there is a possibility of a leak occurring, all work on these systems will require a written procedure or JHA.

3. Work Rules

A. You must have a "White Supervised Access Key" in your possession at all times while in the Supervised Access Area.

You must sign your White Key out and in with the CDF Safety Coordinator.

Use the key to enter the area and make sure the door is locked behind you.

You may not assist anyone else through the door unless they have a White Key.

You may not give your key to someone else.

B. TLD badges are to be worn at all times. Temporary badges are available.

C. Hard hats are required on the floor level because, in general, work is being done above you.

Hard hats are not required in elevated work situations, unless work is being done directly above you or if there is a potential bump hazard. However, since hard hats themselves can become a hazard, you must insure that yours fits securely.

D. Solitary Work is prohibited; the two person rule* is in effect at all times.

E. Smoking, eating, or drinking is prohibited in the Supervised Access area.

F. Climbing harnesses are required when working at heights.

Remember to tie off the harness above you.

Harnesses are not required on fixed lifts when both of the worker's feet are firmly positioned on the lift platform

G. During the upgrade period, long pants and closed toed work type shoes are required.

H. Training from authorized personnel is required before you may use a lift platform.

I. Work on exposed energized high voltage equipment is prohibited

J. Areas around the Central Detector are restricted when the CDF Solenoid magnet is energized.

You must obtain permission from the CDF Operations Manager before entering these areas.

K. Single task permits are required for burning, welding, flame cutting, brazing, and abrasive grinding operations.

You must obtain permission from the CDF Operations Manager before obtaining a permit.

L. Use a Wallflower GM or Frisker detector to survey all material and equipment brought from the Supervised Access area.

Use Radioactive class labels

Notify the Particle Physics Division ES&H Group about any Class 2 or greater objects.

Contact a Rad Tech (p.0193) for radioactive waste disposal.

You may be required to notify the PPD Radiation Safety Officer **before** drilling or coring in the Collision Hall. Check with the CDF Safety **Coordinator**.

I. All work performed near the beam pipe must be cleared by the Operations Manager.

***The Two-Person Rule**

The two-person rule (also called the 'don't work alone rule') is defined as the requirement for the presence in a work area of at least two people who have established and will maintain two-way communication, visual or verbal.

The primary purpose of the two-person rule is to provide rapid assistance to employees and/or users in the event of an emergency. Though this assistance may involve some form of personal assistance or intervention, the contacting of emergency personnel by dialing **x3131** is most often the action to be taken.

Special work rules

When the detector is in the Collision Hall, there may be situations when special conditions exist and when certain work areas will be restricted. During these times, special work rules will be in effect. The CDF Safety Coordinator will advise you of these special rules and conditions when you are issued a key.

4. Emergency Procedures

Various alarms have been installed in the CDF Collision and Assembly Halls to warn of Flammable Gas, Fire, and Oxygen Deficiency. These alarms drive either the "whooping" siren or the fire buzzer.

In the Collision Hall, the entry door from the CDF Assembly Hall is your Emergency Exit. If this exit is blocked, use the exit into the Accelerator tunnel, located in the Southeast corner of the Collision Hall at the top of the stairs.

The "whooping" siren could be either a Flammable Gas or an Oxygen Deficiency alarm and requires evacuation of the Supervised Access Area. Proceed to the Second Floor Control Room and turn in your access key to allow determination of who might still be in the controlled area.

If the Fire alarm buzzer alarms, you must evacuate the Collision Hall and the CDF Assembly Building, as the alarm is common to the entire area. Exit at the nearest available exit, then walk around the building to the West parking lot and return your key to the CDF Safety Coordinator, to allow determination of who might still be in the building.

An intermittent buzzer indicates a tornado alarm. The tornado shelters are the enclosed stairwells in the CDF Assembly Building. Stay there until given an all clear signal.

I have read the document "**CDF Supervised Access Work Rules**" and understand the hazards. I agree to follow all of the listed work rules and the emergency procedures.

Print your name: _____

Your Fermilab ID #: _____
(Or Social Security # if not a Fermilab employee or Visiting Scientist)

Your Signature: _____ Today's Date: _____

(This training will expire in two years or at an earlier date if any of the prerequisite training expires earlier.)

CDF SUPERVISED ACCESS QUIZ

1. You are working in the Collision Hall and you hear an alarm, but are not sure about the type of alarm. You should immediately
 - A) Call 3131.
 - B) Evacuate the Collision Hall.
 - C) Call Dee Hahn.
 - D) Remain in the Collision Hall until the 'all clear' has been given.

2. You will be performing some work in a Supervised Access Area that will require the use of a lift platform. Before using the lift you must:
 - A) Ask permission of your group leader.
 - B) Have previous experience in operating a lift.
 - C) Have someone with lift training train you.
 - D) Take lift training from someone who is authorized to give the training.

3. You plan to work on the floor level of a Supervised Access area late at night. You will need
 - A) A White Supervised Access Key
 - B) A buddy
 - C) A TLD badge
 - D) All of the above

4. When should you consider if a Work Plan/JHA is necessary to do your work
 - A) Only if you think your work will cause a fire.
 - B) Only if you think you can be injured
 - C) Before doing any work in the supervised access area
 - D) Only if the safety officer tells you that one is needed.

Trained by: _____
(must be signed by the CDF Safety Coordinator, CDF Assistant Head for ES&H, or CDF Operations Manager)

7.0 List of Trained People for this procedure.

Individuals read the training document " CDF Supervised Access Work Rules " (see section 6.0), sign the attached form and return the form to the CDF Safety Coordinator.

Signed Supervised Access Training Forms must be kept in the CDF Control Room copy of this procedure until the information is transferred to the appropriate database. At that point the original signed training forms must be moved to the CDF Department Office copy of this procedure and maintained there until the training expires.

A printed copy of the current training database must be attached to all copies of this procedure.

8.0 References and Supporting Documentation.

"CDF Collision Hall Access Routes and Coordination",
memo from H. Edwards, dated January 2, 1987, (attached only to the
CDF Department Office copy of this procedure) is the historical
precedent for this procedure and is included to clarify the Training
document in Section 6.0 above for those individuals issuing authorizing
signatures.

January 13, 1992 (draft) memo from Bill Freeman and Howard Casebolt to
Peter Garbincius and Steve Holmes, " CDF/Dzero ES&H Training /
Access Requirements for RD Employees and Users". This memo is
attached to the CDF Department Office copy of this procedure for use by
those individuals issuing authorizing signatures for this procedure.

A copy of the "White Supervised Access Key Sign-out / Sign-in Form" appears
on the next page.